aerosol-charged space will be subjected during operation to a partial vacuum and, as a result, any leaks may entail an intake of secondary air, but will not release aerosols. The pressure side of the blower 5 issues into the ambient. A waste receptacle of appropriate size is placed underneath the suction device.

[0019] A sample container cap screwed or pulled off in the vicinity of the tube 20 is thereupon released by the aperture device and aspirated by the airflow into the tube 20. From there ~~[said]~~, the cap passes through the tangentially connected suction duct 1 and into the collecting container 2 ~~[where]~~ in which, because of the increasing cross-section, the aspirated air slows, and the cap/stopper ~~[dropping]~~ drops in the direction of gravity onto the flat side 7 of the closing device 4. For the time being, the cap will stay there. In the case of consecutive opening of sample containers, the next arriving cap will also drop on the flat side 7. Any aerosols aspirated together with the air and released from the sample or adhering to the sealing cap/stopper are guided into the filtration cartridge 3 and are ~~[efficiously]~~ effectively retained therein. With respect to medical samples, preferably a filter retaining at least 95 % at a particle size of 0.2 µm shall be selected. Thereupon, the exhaust air can be expelled into the lab without entailing reservations.

[0020] After a number of opening procedures, the screwed or pulled off caps will almost entirely fill the collecting container 2. The control of the automated sample handling apparatus then switches ~~[OFF]~~ off the blower 5 for a given time interval and, as a result, the partial vacuum in the collecting container 2 will become less. The weight of the stoppers acting on the flat side 7 of the closing device 4 causes ~~[latter]~~ the closing device to pivot into the open position shown in Fig. 1. As such, the flat side 7 and the guide elements 9 ~~[constituting]~~ constitute a chute for the sealing caps and from which they drop into the waste receptacle. After the collecting container 2 has been emptied, the counterweight 13 restores the closing device 4 to its closed position ~~[which shall be reinforced by switching ON the blower 5, that is by the resultant partial vacuum. Thereupon]~~, which is reinforced by re-establishment of the partial vacuum when the blower 5 is again switched on. Thereupon, the system is ready to process further caps.

[0021] The power interruption to the blower 5 for the purpose of emptying the collecting container 2 may be comparatively short, for instance 5 to 10 ~~[s]~~ seconds. Such a time interval is admissible in the course of typical sample handling of blood or the like and ~~[it]~~ will not interrupt

regular analysis because the sample tubes or [vials] containers drop into pallets and, following a given number of opened [test vials] sample containers, the pallet will have to be changed. The size of the collecting container 2 may be matched to the size and number of sealing stoppers accumulating at one pallet and, as a result, the caps of a full pallet will fit into the collecting container 2. Interrupting the power to the blower then may be scheduled into the interval [anyway] required for pallet changing.

[0022] This procedure offers the advantage that the waste receptacle underneath the suction system can be emptied any time without [thereby] shutting down the whole equipment[--whereas]. This is unlike conventional suction systems [entail] that require such a system shutdown when the waste receptacles [must] are to be emptied or changed. Unlike the case of the state of the art, the waste receptacles of the invention need not be resistant to partial vacuum because they are not [being] subjected to it. Accordingly, pouches and other bags may be used that subsequently only require being easily and reliably closed.

[0023] Again, it is highly advantageous in practice that the collecting container 2 may be emptied in an automated, controlled manner, [in] that the applicable centrifugal blowers 5 may be operated at comparatively lower powers and, hence, will generate relatively little noise, and [in] that relatively reliable filtering, for instance of pathogenic germs, is feasible. Opening and closing the closing device can be implemented merely by controlling the operational voltage of the blower 5, and as a result, the control means of the entire automated sample handling apparatus need only provide this function.

[0024] An appropriate blower for instance is RG160-28/14N made by Papst GmbH, St. Georgen, [DE] Germany.

CAP ASPIRATING SYSTEM.

The present invention relates to an aspirating system for caps of sample containers exhibiting the features of the preamble of claim 1.

Such suction systems illustratively are used in automated apparatus opening blood sample containers. The blood samples or other body fluids to be analyzed in general are contained in glass or plastic tubes sealed by a rubber stop or a screw cap. These sample containers are placed in conveyor chain and then are opened individually by a gripper exerting a simultaneously rotating and pulling motion. The sealing cap/stopper removed in this manner from the sample container is aspirated away and put into a collecting container. The suction system provided for this purpose is substantially the same in concept as the industrial suction systems known as vacuum cleaners where a blower is mounted on a reservoir and the suction hookup is connected to the opening device. A blood sample handling system of this kind is known from the German patent document DE 195 17 439.9.

Also suction systems operating with compressed-air injectors are known for the same purpose. On one hand such apparatus entails large quantities of compressed air and on the other hand all the compressed air must be filtered to remove aerosols from it. Equipment costs and scope are very extensive.

The pertinent state of the art incurs the drawback that on one hand its suction systems are bulky and because of the high motor power also relatively loud and on the other hand -- and precisely with respect to blood samples and other medical samples -- filtering can be carried out only insufficiently. Lastly the known suction systems in practice incur the difficulty that the entire collecting container which at the same time also supports the blower, must be removed